EE14 - Lab 5: Scrolling Custom Message Display

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Goal:

Display your own message on the LCD display using the direction buttons on the joystick. The user can press up or down on the joystick to scroll through numbers, letters, and punctuation. The user can press left or right to select the position being written to. The user can press the center of the joystick when they are done and the message will be scrolled across the screen.

Approach

Store all of the displayable characters (0-9, A-Z, space) in an array. Use the up and down buttons on the joystick to increment or decrement an index corresponding to that array. Each time the button is pressed, print to the LCD display.

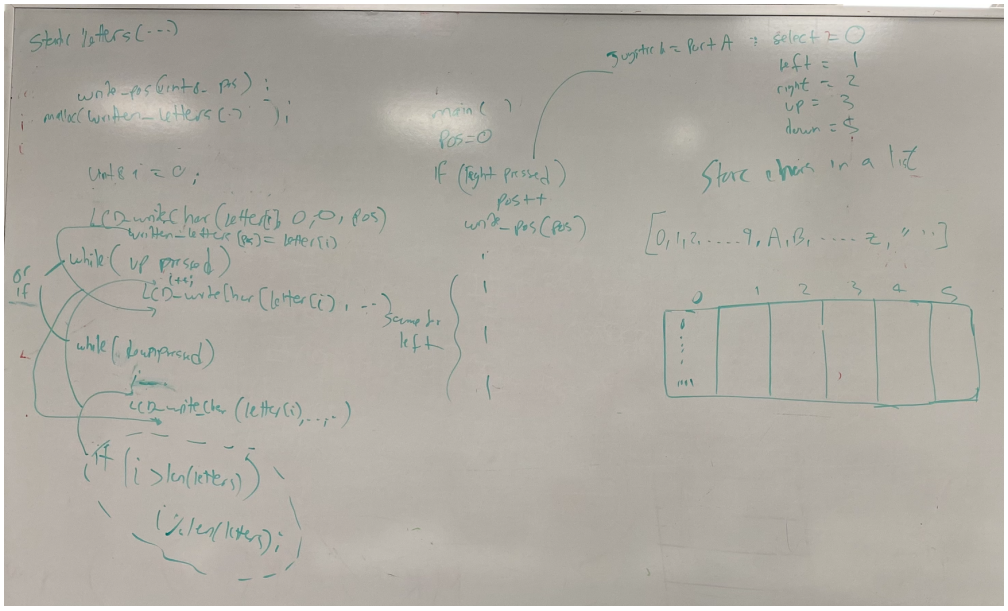
Initial Setup

In main.c for our program, we would first define an array that contains the possible characters that we can write to the LCD. We would also define a malloc'd array of the letters that we have already written to the display.

Write_pos

We'd also create a function called write_pos which takes in a given position in the LCD. At a given position, write_pos will write to that position the first character in the array of possible characters. The user can change this character by using the up and down buttons of the joystick to increment or decrement through the array of characters. As the user scrolls up or down through the array of characters, the LCD gets updated to the new scrolled-to value in the array for that position. If the user reaches the beginning or end of the array of letters, it will loop to the other end of the array. Once the user has selected their character, they can press the right or left joystick button to first update the malloc'd array with the written letter and then move to a new position. If the new position is the end of the LCD, then we would shift all the written characters in the LCD over by one location to the left, and leave the last spot open. This open last spot is where we would write our next character. The user indicates that they are done writing their string by pressing the center joystick button, which will start scrolling the malloc'd array of letters across the screen.

We wrote a lot of this out on a whiteboard.



Success Criteria

We should be able to print as many characters as desired and be able to scroll them across the screen.

Schedule

Lab 1: Work on selecting a single character in the first position of the display. If there's time, work on shifting to the left or right to print more characters.

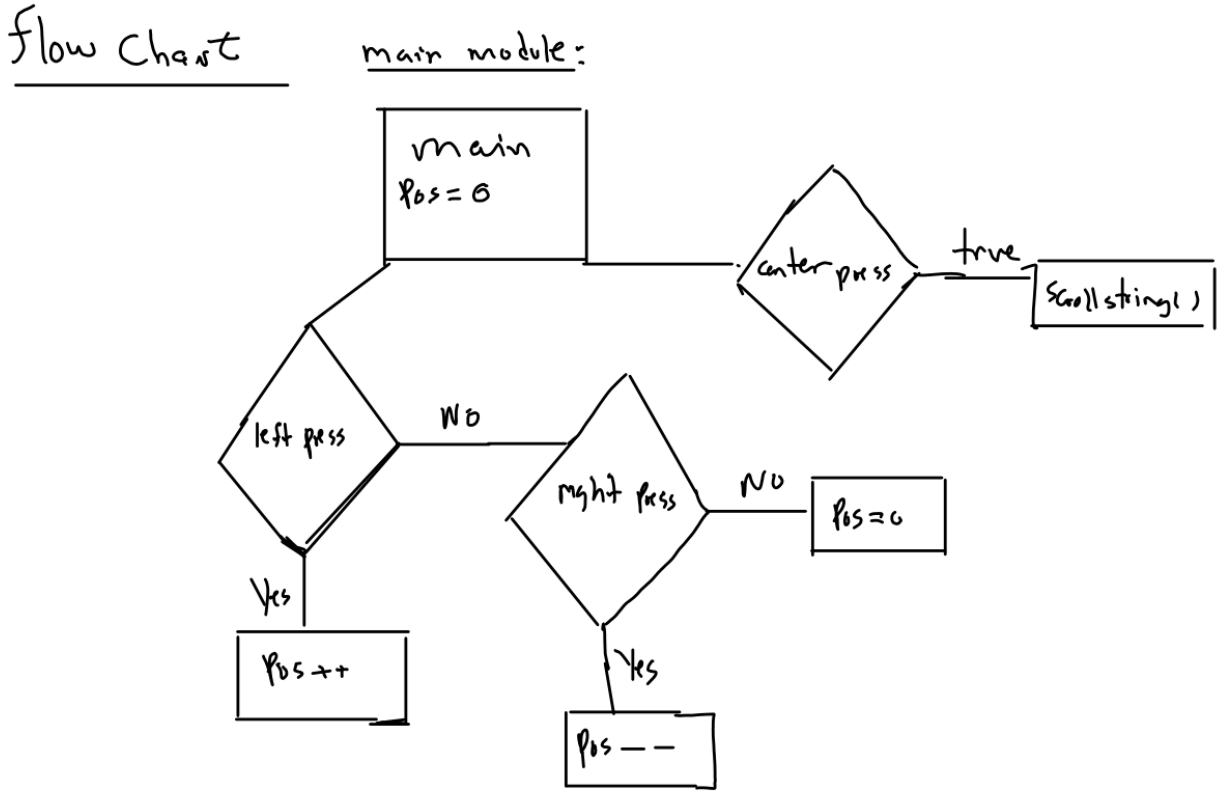
Lab 2: Work on printing more than 6 characters by shifting the previous letters to the left. Finish up by calling the scroll function.

Checkpoints

By the end of Lab1, we should be able to press up or down on the joystick and have it toggle through the list of characters in the first position.

By the beginning of Lab2, we should be able to move through all positions 1 through 5. By the end of Lab 2, we should be able to print as many characters as desired and be able to scroll them across the screen.

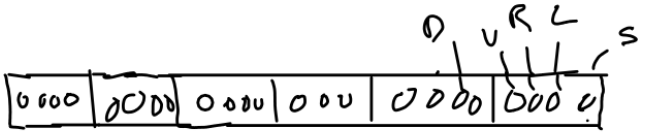
Diagrams:


Flow Chart
main module:
main
Pos = 0
center press
true
ScrollString( )
left press
NO
right press
NO
Pos = 0
Yes
Pos ++
Yes
Pos --

Constants:

define letters = [0, 1, 2 ... 9, 'A', 'B', ... 'Z', " "]

define written letters = array of letters we have written so far

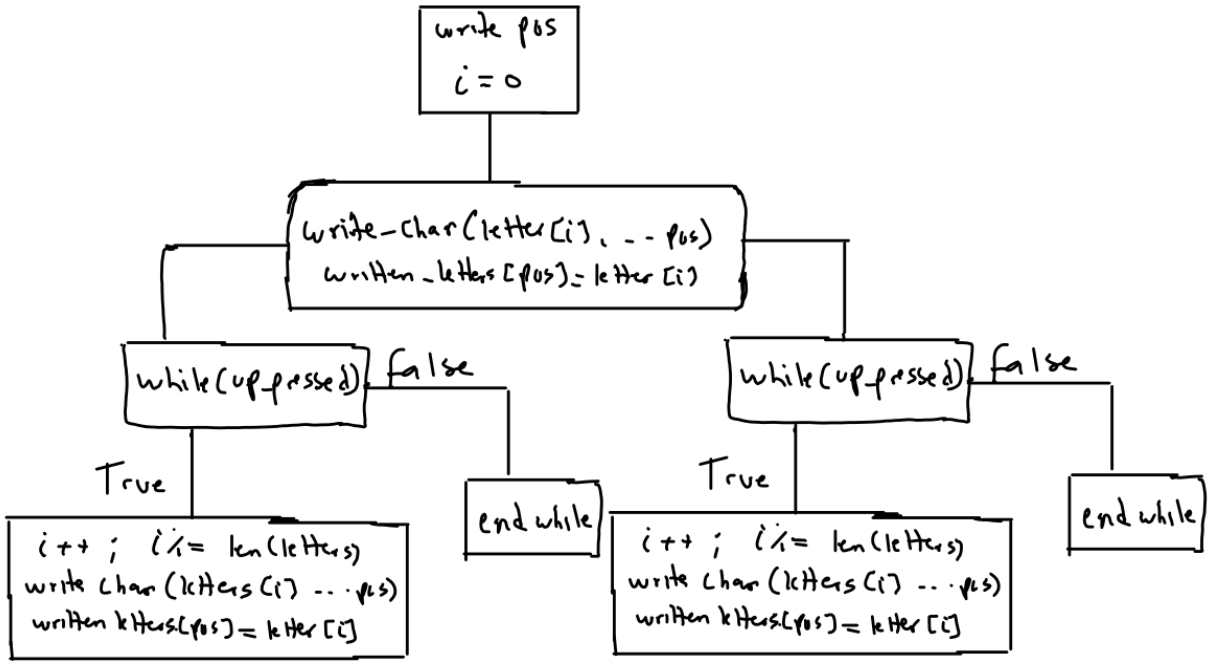


GPIOA — joystick:
- select = PA.0
- left = PA.1
- right = PA.2
- up = PA.3
- down = PA.5

GPIOAEN & 0x10 or

0x01 — select=S
0x02 — L
0x04 — R
0x08 — U
0x20 — D

write_pos module:



to build: